who had been treated for typhus, and on one occasion, the excrements of a patient who died of typhus abdominalis with ulceration of the ileum. Although in these cases we did not meet with the crystals in a remarkably larger quantity, we do not lay much weight on the circumstance. In the dead bodies of patients who laboured under very different diseases, crystals may be found, which cannot be detected in the fresh excrements. But from the renewed observations of Professor Schœnlein, it appears, that crystals occur more frequently in the alvine evacuations of typhus than in any other kind of excrements."

10. *Cholesterine from an abscess.*—M. Lassaigne observed, that an abscess on his leg, which had burst, and discharged a bloody puriform matter, when dried was covered with small scales, like those of a fish. These scales possessed all the properties of cholesterine, being soft, soluble in hot alcohol, and melting at a high temperature. M. Caventou, in 1825, detected cholesterine in the pus discharged from an abscess above the malar bone.—*Journ. de Chim. Méd.* Nov., 1836.

11. *Remarkable instance of Deformity of the Pelvis.*—Professor Naegele of Heidelberg, recently presented to Dr. Montgomery of Dublin, a cast of the pelvis of a woman who was perfectly well formed, and gave birth to five full grown healthy children with the greatest facility. But being unfortunately attacked with malacosteon, and becoming again pregnant, at the close of gestation the pelvis was found so contracted as to leave no possibility of delivery except by the Cæsarean operation, from the effects of which the woman died, and the pelvis was found to present the greatest degree of contraction that has ever been known to require the interference of art.

In the dry preparation the distance between the promontory of the sacrum and the ramus of the pubes, is scarcely a quarter of an inch, so that when covered by the soft parts, these points must have been in contact. The greatest antero-posterior diameter at either side is only an inch and a quarter, and during life could not have exceeded an inch; the sacrum is bent in so as to form a right angle, and the ilia are folded or doubled in upon themselves, like softened pasteboard. Professor N. considers it "the most perfect specimen of contraction of the kind which has ever been made known to the profession."—*Dublin Journal*, Jan. 1837.

MATERICA MEDICA AND GENERAL THERAPEUTICS.

12. *Physiological action of Iodine and Hydriodic Acid.* By Andrew Buchanan, M. D.—The effects of iodine on the animal economy have not been discriminated with sufficient care from those of hydriodic acid, although the two substances, considered as physiological agents, are just as distinct as chlorine and muriatic acid.

The physiological effects of iodine are exceedingly similar to those of chlorine. It acts as a corrosive irritant, exciting inflammation and combining chemically with the tissues to which it is applied. This simple local action is all that, strictly speaking, can be ascribed to iodine, for there is not the least reason to suppose that it is ever absorbed and mingled with the circulating fluids in the uncombined state. The other effects which have been ascribed to iodine are either those of hydriodic acid, or they are secondary effects arising from the inflamed or ulcerated state of the alimentary canal,—which the iodine has produced. To the latter series of effects must be referred the whole of the fearful train of symptoms which have been described by toxicologists under the name of *iodism*, and have been attributed, but most erroneously, to the slow accumulation of the poison in the body. This conclusion appears to me to be fully warranted by considering, that while such symptoms have been observed to result from the use of iodine in forms capable of exciting local irritation, it has been ascertained by numerous trials made in the hospital and out of it, as well by myself as by various medical friends who have done me the favour to state the result of their observations, that no such symptoms result from the use of iodine divested by starch of its local irritant power. Many of the symptoms, too, which have been described, such as indigestion, pains of the stomach and bowels, emaciation, and febrile excitement, are of a kind very likely to result from gastro-intestinal irritation; and with respect to the rest of them it is difficult not to entertain a suspicion that some of them at least may have been admitted as effects of iodine from inaccurate observations. However that may be, I can only say, that I have never seen the use of iodine followed by wasting of the testicles or of the mammæ, by palpitations, faintness, excessive debility, hurried, anxious breathing, dinginess of the skin, copious clammy sweats, increased menstrual discharge, or an oily appearance of the urine, which are enumerated among the symptoms characterizing the supposed affection termed iodism. Some of the symptoms described, indeed—such as bilious diarrhœa, and a diminished secretion of the saliva, are the very reverse of the effects which I have usually observed to flow from the use of the preparations of iodine.

I go on to speak of the effects of hydriodic acid, which I think it does not admit of doubt ought to be regarded as the true medicinal agent, possessing the alterant virtues which have been ascribed to iodine itself. The hydriodic acid, in the concentrated state, is most probably, like the muriatic, a corrosive irritant, but by dilution with water it is completely divested of its irritant quality. In the diluted state, however, it is probably not without a local action on the alimentary canal. Most probably it acts as a tonic. At all events the analogy of the other mineral acids, in which tonic virtues are so generally recognised, warrants the opinion, as at least probable, that it is to the hydriodic acid that ought to be referred the tonic effects which so many observers have described as resulting from the use of iodine.

The hydriodic acid, whether prepared within the body or introduced ready made, is an exceedingly absorbable substance. When given in doses equivalent to ℥ij. of iodine daily, the whole of it appeared to be taken up and mingled with the circulating fluids. What are the fluids with which it mingles, and the secretions by which it is discharged? I have already mentioned, that when hydriodate of potass is given in a dose of ʒij., iodine is found abundantly in the blood in from four to six hours afterwards. I must also, however, mention, that when iodine is given in smaller doses, although the use of it be continued for a great length of time, no iodine can be detected in the blood on the most careful examination. Mr. Lumsden, to whose kindness and analytical skill I have to acknowledge my obligations, examined both the serum and crassamentum in several patients taking iodine in full doses, and in many of whose secretions it was contained in abundance, without being able to detect any trace of it. How to explain these facts I do not know, unless we are to suppose that iodine does not find its way into the sanguiferous system unless when given in such a quantity at once that the system is completely deluged with it; but that when given in smaller quantities it is not admitted by the extremities of the veins, and is transmitted along the capillary vessels in a way which we do not at present understand. It will be seen immediately that the vessels of certain excretories appear to possess a similar power of rejection over this substance. I have already mentioned, that after giving a full dose of the iodide of potassium, iodine was detected in abundance in the serum exhaled into the serous cavities, and in the synovia of the knee-joint. Of the secretions, it was in the urine that iodine was always detected in greatest abundance. It appeared in the urine about four hours after the first dose was taken, and continued to be detected in it for four days after the last dose was taken. In one or two instances it was found on the fifth and even on the sixth day after. It continued to be observed for the same length of time whether the iodine was given in one large dose, or the body had been gradually impregnated with it. Next to the urine it was in the saliva that the iodine was most abundantly found. It was found also invariably in the tears, and in the mucus of the nose, although in the latter case it was impossible to determine whether it was really secreted by the schneiderian membrane, or came down from the lachrymal gland. Iodine was found also in the milk, but it existed in that secretion in a very small proportion compared with that in which it was found to exist simultaneously in the urine and saliva. Iodine was also found in examining the mucus secreted from the lungs in chronic bronchitis, but it was difficult to determine whether its presence was not owing to an admixture of saliva.

While the hydriodic acid is thus widely diffused over the body, it would be to generalise too hastily to infer that it exists in all the animal fluids. I have already mentioned, that it is only in certain circumstances that it is to be found in the blood, and there are certain secretions the vessels preparing which appear constantly to reject it. At all events in none of the trials made could any portion of iodine be detected in them. Of these secretions or exhalations the first to be mentioned is the perspiration. I am aware that iodine is said to have been found in the perspiration, but I can only say, that in experiments carefully made and frequently repeated upon patients taking iodine in very large doses, and whose urine and saliva became as black as ink on being tested in the usual way, not the slightest trace of iodine could be detected in the perspiration. The perspiratory fluid examined in these experiments was forced out by the use of diaphoretics, or was collected from the forehead of the patient in the hot bath. At the same time the water of the bath itself in which the patient was immersed, was examined, but with no better success. It may, therefore, I think, be confidently affirmed, that iodine is very rarely, if ever, present in the perspiration. Another fluid, in which I very early looked for iodine, and fully expected to find it, was the purulent matter secreted from sores, for the cure of which iodine was exhibited, but in none of very numerous experiments made on patients fully saturated with iodine, could the slightest tinge of the medicine ever be perceived in the purulent discharges. The absence of iodine from the discharges from the skin, and from ulcerated surfaces, is rendered the more remarkable by its efficacy in the cure of cutaneous diseases, and various forms of ulceration. I have only to add further, that in one or two experiments, iodine was not found present in the serous fluid of blisters.

The whole of the hydriodic acid introduced into the body is discharged along with the urine, with the exception of the very small proportion of it contained in the rejected saliva and mucus of the nose, and milk, when that secretion is going on in the female. The greater part of the saliva being swallowed, the iodine contained in it must be absorbed a second time from the stomach and bowels. A similar reabsorption must take place of the iodine contained in the exhalations that are reabsorbed by the surfaces which effuse them. Thus, after describing many circuits, in various directions, through the body, nearly the whole iodine introduced comes ultimately to be discharged with the urine. The time occupied in this circuitous passage of the iodine is, as has been already remarked, generally four days.

Iodide of potassium is absorbed very readily from the skin: it is found in the urine just as when it is introduced into the stomach, but much less speedily.

With respect to the influence of the preparations of iodine we are here considering over the organs of digestion and assimilation, that influence was, to say the least of it, certainly not of an unpropitious kind; on the contrary, in patients employing these medicines in full doses, the tongue was almost invariably free from fur, and of a healthy red colour; the appetite and digestion were good, and in many instances there was a most obvious improvement in *condition*. Of the two great alterant medicines we possess, iodine and mercury, it is certainly a most important advantage of the former over the latter that it admits of being given freely, not only without injury, but with advantage to the general health; while mercury, given in full doses, is always a dangerous medicine, and often the means of doing irreparable injury to the constitution. The iodide of starch frequently caused costiveness, attended with griping pains of the bowels; and, as was observed in many instances, with a paleness, approaching to a clay colour, of the alvine discharges.

These effects I was inclined to refer to the large quantity of hydriodic acid generated in the stomach, abstracting the free soda from the bile, and probably otherwise modifying its qualities, besides, perhaps, exerting a direct astringent action on the bowels themselves. The occurrence of these symptoms required the use of a laxative. In some cases, but very rarely, the iodide of starch produced the opposite effect of causing purging. In persons of weak digestion, it was often necessary either to give up the medicine altogether, or at least to diminish the dose of it, owing to the occurrence of pain in the stomach. It is possible that the conversion of iodine into hydriodic acid requires a certain vigour of digestion; and if so, the pain occurring in such cases may have been owing to the imperfect mode in which the process of conversion was carried on.

A question has of late been agitated—Whether iodine ever causes salivation?

It does not, according to my observations, generally do so; but that it does so occasionally, I think there can be no doubt. In a man who had taken 2864 grains of iodine in the course of 42 days, in the form of iodide of starch, the medicine required to be given up on account of salivation, which was as profuse as I ever saw caused by mercury, and attended with swelling of the face and ulceration of the inner membrane of the mouth. It only differed from a mercurial salivation in being much less obstinate, going off as soon as the iodine disappeared from the saliva. I never saw this symptom occur to the same extent in any other case, but I have repeatedly seen it in a less degree. The man in whom it took place had been frequently salivated with mercury on previous occasions.

In several cases the pulse was accelerated when the system was impregnated with iodine; in many other cases no acceleration could be perceived. Upon the whole, one of the most remarkable circumstances attending the use of this medicine was the absence of symptoms produced by it. Patients who took the largest doses went about, and took their food, just as usual; so that had it not been for the peculiar chemical condition of their secretions, and in many instances the rapid disappearance of their diseases, it would not have been supposed they were taking medicine at all.

With respect to the relative efficacy as medicines of the iodide of starch, hydriodic acid, and iodide of potassium, I am inclined to place them in the order in which they have just been enumerated; although I must admit that the superiority which I ascribe to the first is perhaps owing to my having prescribed it most frequently. The action of all of them, however, is very similar. The only mode of explaining the similarity of action on the body of substances so dissimilar in nature, is by considering the hydriodic acid as the active principle, producing the physiological and therapeutical effects usually ascribed to iodine. It has been already stated, that free iodine is immediately converted in the stomach into hydriodic acid. As to the hydriodate of potass, it is clear that in its passage through the body the muriate and phosphoric acids must lay hold of the potass, so that the hydriodic acid will combine with the weaker bases, the soda and lime, and thus pervade the system nearly in the same state as when free hydriodic acid itself is employed. The presence of the potass, however, must produce an important difference in the action of the hydriodate, which I have no doubt a more attentive observation will hereafter enable us to discriminate.

If the hydriodic acid be the active principle to which the alterant virtues ascribed to the preparations of iodine are to be attributed, analogy will lead us to range those preparations in the series of medicinal agents along with the muriatic, the sulphuric, the nitric, and other mineral acids,—all of which have been held to possess alterant virtues, and have been used on that account in syphilis and other diseases; and the great success which has attended the use of the hydriodic acid may serve as an inducement to try the other mineral acids more extensively, and in fuller doses, than they are commonly prescribed.—*Med. Gaz.* July 2, 1836.

13. *On the Therapeutic value of extracts of the Solanea containing Green Fecula.* By MM. Martin-Solon and Soubeirain.—Extracts prepared from juices which have not been purified, and containing consequently the green fecula of the plants, have been recommended by Störck, and generally considered as useful medicines. In the greater number of plants, what is improperly called green fecula consists of a mixture of chlorophyle, of coagulated gluten, and of the debris of tissue,—substances of no medicinal value; but it would be wrong to conclude on this account that the green fecula of *all* plants is useless: it, however, may be doubted whether the opinion of those pharmacologists is correct who consider this fecula as the only active part of this family of plants, and do not hesitate to substitute it for the extract itself. MM. M. and S. have made experiments on the properties of the green fecula of belladonna, hyoscyamus, and stramonium, in order to determine whether it is a necessary ingredient in the common extracts, or if it could be separated without injuring their virtues. The experiments were made with two kinds of green fecula; the first, which may be called the insoluble matter of the juices, is that which is held in suspension after the tissue of the plant has been broken down, and been submitted to expression. It was collected by filtering the juice, and purified by several washings. The second kind, which is called green fecula, obtained by coagulation, is procured from the filtered juice after it has

been heated. It contains, in addition to the ingredients composing the first species, albumen which is coagulated by the heat, and some matters entangled by the albumen during coagulation. In order to divide the doses equally, the fecula was, when still moist, mixed with sugar, and then dried in a stove.

Insoluble Green Matter of Belladonna. This was given to two patients: the first was a woman of sixty, with catarrh and chronic gastritis; one grain was given the first day, and the dose increased one grain daily. On the tenth day, the patient complained of muscæ volitantes: the dose was increased to fourteen grains without its producing any peculiar symptom whatever. The second patient was a woman, æt. thirty-two, convalescent from articular rheumatism: the dose was gradually increased to twenty grains, and no effect produced.

Green Fecula of Belladonna obtained by Coagulation. The first patient was a woman, æt. twenty, affected with rheumatic pains. Two grains were given at first, and the dose increased two grains daily. At fourteen grains, she complained of pain in the throat; she slept well, but dreamed more than usual, and had occasional spasms of the legs. When the dose was sixteen grains, she suffered much from her throat; her dreams were sad and frightful; her head heavy, pupils dilated, pulse regular; no rheumatic pains. The medicine was discontinued, and on the following day these symptoms entirely disappeared. The second patient was a phthisical young man of twenty: on taking twenty grains, he complained that his sleep was less tranquil than usual; no other symptom. In a third patient, æt. forty-four, phthisical, pain in the throat was complained of after taking ten grains; after fourteen, the pain increased, with slight headach; after sixteen, there was slight trembling of the hands, but the sleep was quiet. This tremor increased on augmenting the dose, and the medicine was discontinued.

Insoluble Green Fecula of Hyoscyamus niger. One trial was made in a young man, æt. twenty-two, convalescent from pneumonia. After taking twelve grains, he found some weakness of vision; his sleep was a little agitated.

Green Fecula of Hyoscyamus obtained by Coagulation. The patient was affected with habitual headach: dose augmented daily two grains. After taking ten grains, his sleep was disturbed; after fourteen grains, he slept more, but he complained of uneasiness in his legs; eighteen grains produced nausea, heaviness of the head, sleep disturbed by dreams. The medicine was omitted, and the day afterwards these symptoms ceased.

Green Fecula of Stramonium. Both kinds were given to the patients, and the dose carried to twenty grains, without any effect.

From these experiments, it may be doubted whether the green fecula which is left in the extracts of the plants with the juice can add to their efficacy: indeed, it is a question whether their activity may not be impaired by the mixture of the active principle with so much inert matter. It is not unreasonable to conclude, that the slight effects in some of the experiments were owing to a part of the soluble principles of the juices remaining mixed with the green fecula, particularly as the coagulated fecula was the most active, which was washed with less effect. These experiments, however, are not sufficient to decide the question. Störck prepared his extracts with a heat so gentle as not to injure the juices, instead of evaporating them, as was the general custom, by prolonged ebullition, to the great injury of their active ingredients. This may account for the success he and others experienced.—*B. & F. Med. Rev.* Jan. 7, 1837, from *Bull. Gen. de Thérap.* Feb. 7, 1836.

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14. *Hydriodic Acid.*—Dr. ANDREW BUCHANAN gives the following formula as that according to which the liquid hydriodic acid is prepared in the Glasgow Royal Infirmary; ℞ Iodidi Potassii, grs. 330, Acidi Tartarici, grs. 264.

Solvantur seorsim in Aquæ destillatæ, ℥iss. Misceantur solutiones et quum subsederit Bitartras Potassæ cola. Colato adde aquæ quantum sufficiat ut sint totius liquoris drachmæ quinquaginta, ʒL. = ℥vi. ʒij.

Acidum hoc Hydriodicum liquidum, habet Iodinii, gr. v., in singulis drachmis.

It is a fact well known to physiologists, says Dr. B., that when free iodine is introduced into the stomach, it is speedily converted into hydriodic acid. This conversion is probably effected differently in different cases. If a large quantity of uncombined iodine be swallowed when the stomach is empty, the hydrogen with which it combines may be furnished in part by the gastric juices, but it can scarcely be doubted that it is chiefly supplied from the tissues of the stomach itself, which undergo corrosion. When, however, the iodine is given in combination with starch, it is probable that the starch, while under digestion, furnishes the hydrogen which goes to form the hydriodic acid, and in this way the starch defends the tissues of the stomach from the corrosive action which they would otherwise undergo. It appeared to me, however, that it would be well to save the stomach the labour of preparing the hydriodic acid, by giving, for the purposes of medicine, not free iodine, but the hydriodic acid itself.

I was the more inclined to make this experiment, as it would enable us to determine, from direct evidence, whether the opinion, rendered so probable by general reasoning, be also borne out by experience, that hydriodic acid closely resembles iodine in its effects upon the body, and is in reality the active principle to which the ordinary preparations of iodine owe their medicinal efficacy. The trials made of the hydriodic acid as a medicine fully realized the expectations entertained of it.

The processes recommended in works upon chemistry for forming hydriodic acid are not well adapted for the purposes of medicine, both on account of their complexity, and because they do not yield an acid of which the strength is uniform and easily estimated. The strong mineral acids cannot be employed in decomposing the iodides to form hydriodic acid, as is done in forming muriatic acid from common salt, because those acids re-act on the hydriodic acid as it is generated. The tartaric acid, however, is not liable to the same objection; and I found on trying the experiment of treating iodide of potassium with tartaric acid, in the proportions necessary to form cream of tartar, that hydriodic acid was readily obtained in a state of sufficient purity for the purposes of medicine, although holding some cream of tartar in solution. To diminish as much as possible the quantity of cream of tartar dissolved, the acid and salts are each dissolved in a very small quantity of water, the rest of the water not being added till the precipitated cream of tartar has been removed by filtering. The liquid acid thus obtained has an agreeable sourness. It is at first limpid, or with only a slight yellow tinge; but as happens to this acid, in whatever way prepared, on being kept it soon assumes first a wine yellow, and next a beautiful red colour, from a portion of the acid undergoing decomposition, while the iodine disengaged is dissolved in the rest of the acid. It has been ascertained that this process of decomposition may go on till one-half of the acid is decomposed, when the colour of the liquid is a very dark red, approaching to black. The diluted acid, however, prepared as above, may be kept many months without at all approaching this limit.

The liquid hydriodic acid thus prepared I first tried as a medicine in the dose of a few drops. That dose was gradually increased to ʒj. three times a day, equivalent to gr. xv. of iodine, and at length to ℥ss. three times a day, equivalent to ʒj. of iodine. This last was the ordinary dose in which I exhibited the medicine, although I have given as much of it as ℥j. three times a day, or ʒij. of iodine daily. The acidity of this medicine renders it one of the most agreeable preparations of iodine. The results obtained from numerous trials of its effects were—1st, That the hydriodic acid, if pure (by which I mean, not holding iodine in solution), has no local irritant action if sufficiently diluted. 2nd, That it is absorbed, and pervades the tissues of the body, and comes out with the secretions in the very same way as when free iodine is exhibited. 3d, That its therapeutical virtues are like those of free iodine.

The pure liquid hydriodic acid, having no irritant action unless in a state of concentration, may be safely given in water as a vehicle. When, however, the acid has undergone decomposition, the iodine dissolved renders it irritant, forming a preparation perfectly analogous to Lugol's solution, of which it has been already stated that only a small dose can be given without inducing symptoms of gastric irritation. I always, therefore, adopted the precaution of giving hydriodic acid in a solution of starch as a vehicle. But for this precaution, owing to the great proneness of the acid to undergo decomposition, it would prove a very dangerous medicine for continued use. By using the starch as a vehicle, however, it is rendered perfectly safe, for the iodine of the decomposed acid combines with the starch, and thus the portion of the medicine which is not given as hydriodic acid is given in the equally innocuous and efficacious form of iodide of starch. Neither is it necessary, in prescribing, to make any allowance for changes in the strength of the acid from decomposition, for the part of it which has been decomposed is immediately reconverted into hydriodic acid on being introduced into the stomach.—*London Med. Gaz., July* 2, 1836.

15. *Iodide of Potassium.*—Dr. Buchanan says he has given this substance in doses of half an ounce, and the only precaution he observed was to make the patient drink freely of diluents. "No pain of the stomach or bowels was," he says, "produced, and the medicine never in the least degree operated as a purgative, but seemed to be altogether absorbed, and was discharged chiefly by the kidneys.

As the iodide of potassium is very often adulterated, it is necessary, to prevent any suspicions from arising in the mind of the reader as to the purity of the medicine employed, to state, that the iodide of potassium used in the Glasgow Infirmary is prepared under the direction of a most able chemist, within the walls of the hospital, where there can be no motive to adulterate it.

It was not merely for the purpose of determining the dose of the hydriodate of potash that these large quantities of it were given. I found that to give it in such doses was the readiest mode of determining certain physiological questions with respect to the diffusion of this medicine over the body; for so large a quantity of it being at once introduced into the system, every fluid into which it is permitted to enter is at once impregnated with it. It is in this way that it is most easily detected in the blood. Two drachms of it were given to a young man affected with gonorrhœa, and as soon as the medicine made its appearance in the urine, which was four hours afterwards, blood was drawn from his arm. On examining the blood, both the serum and crassamentum were found deeply impregnated with iodine. The same dose was given to a boy affected with dropsy of the knee-joint, from which it had been resolved to draw off the fluid. About five hours after the dose had been taken, a very small puncture was made into the joint, and upwards of twelve ounces of synovia drawn off by the cupping-glass. The synovia contained iodine in abundance. To an old man who had one of the largest hydroceles I ever saw, two drachms of the hydriodate of potass were given over night, and the same quantity the following morning. On tapping him some hours after he had taken the last dose, fully more than thirty ounces of serum were discharged, containing a large quantity of iodine.—*Ibid.*

16. *Results of experiments with Kreosote.*—Dr. J. Cornelıani, Professor of Internal clinic in the University of Pavia, has investigated the powers of the kreosote experimentally, both in his clinic and on several species of animals. He has employed it, internally, endermically, and finally by injection into the veins; and has varied the dose from the smallest to the highest. The following are his results:

1. Kreosote taken internally, in a large dose, may produce instantaneous death, without any organic lesion being observed on post mortem examination, if made immediately.

2. When pure or very slightly diluted kreosote is applied directly to a larger nerve, as the par vaguum, or it is injected into a vein even in small quantity, death instantly follows.

3. If the quantity is not sufficient to produce death, it causes prostration of the muscular and nervous systems; and symptoms of paralysis of the extremities, heart, diaphragm and organs of the senses, which leads to the belief that the kreosote acts like the narcotic debilitants, among which it should be arranged.

4. Although no antidote has yet been indicated against its toxicological effects, it appears that general stimulants are indicated, unless it has acted upon the stomach, in that case the debilitants, and especially narcotics, as the prussic acid, increase its fatal effects.

5. The kreosote also exerts more or less active mechanico-chemical action, on the gastro-enteritic mucous membrane, which gives rise to various organic lesions met with in the dead body, and to chronic gastro-enteritis in which persons are subject who make use of this article for a long period.

6. To counteract this mechanico-chemical effect produced by the kreosote taken internally, oleaginous and mucilaginous drinks should be administered. Vinegar being an excellent solvent of this substance—prevents its deleterious effects by favouring its contact with the nervous papillæ of the stomach.

7. In general patients cannot bear a larger dose than two drops, repeated four or six times in the 24 hours.

8. Kreosote taken internally, may be useful in diabetes mellitus, polydipsia, hemoptysis, chronic catarrh, diarrhœa, palpitations of the heart, inflammatory fevers (*angiotenies*) and perhaps also in tetanus.

9. A singular effect of the kreosote taken internally appears to be its prompt action on the urinary organs; for the animal experimented on, urinated as soon as he took it. Dr. Corneliani ascribes this to the paralysis it causes, especially of the neck of the bladder.

10. The application of kreosote to the exterior in chronic inflammations of the skin, and especially in herpes (dartres), itch, chronic psoriasis, may be often useful, whether its action is drying, antiphlogistic or insecticide.

11. If the kreosote used externally is not applied to a large surface or upon important nervous branches, it produces no alteration of the organs, even of those upon which it more especially acts, as the spinal marrow, the brain and the kidnies. Dr. Corneliani has however observed that in phthisical patients, the inspiration of the kreosote may give rise to prostration of the intellectual functions and muscular movements.

13. If the external employment of the kreosote does not arrest venous hemorrhage, at least that of a large vein, as the femoral of a sheep, it is efficacious in hemorrhage from an artery of moderate size.—*Journ. de Chimie Médicale*, Feb. 1836.

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17. *Iodide of Starch.*—Dr. Andrew Buchanan, Junior Surgeon to the Glasgow Royal Infirmary, in a communication in the *London Medical Gazette* (2 July, 1836) extols this preparation of iodine, which he prepares in the following manner:—℞. Iodine gr. xxiv.; Amyli in pulveren tenuissimum triti ℥j. The iodine is first triturated into a little water, and the starch gradually added, the trituration being continued till the compound assumes a uniform blue colour. The iodide is then dried with a heat so gentle as not to drive off the iodine, and it must be afterwards kept in a well stopped bottle.

The iodine, in the usual forms of exhibition, cannot in general be safely given in larger doses than four or six grains daily; whilst in the above formula Dr. Buchanan has given as much as 72 grains daily. Dr. Buchanan is in the habit, in persons not labouring under dyspepsia or constitutional delicacy of habit, and whom he wished to put under the influence of iodine, of commencing with the iodide of starch in doses of half an ounce three times a day, and increasing it immediately afterwards to ounce doses if necessary. "As there is no great reason," he observes, "for nicely apportioning the doses, a heaped tea-spoonful, dessert-spoonful, or table-spoonful are convenient enough measures for smaller quantities in private practice. I have always directed the medicine to be taken in a draught of water gruel."

It might rationally enough be supposed from the large doses in which the medicine is administered by Dr. Buchanan, that it is an inert preparation, but such seems not to be the case, as Dr. B. has detected the iodine abundantly in the secretions, showing it to be absorbed; and has been unable to detect any traces of it in the stools of patients taking it in large doses. It certainly must exert a less irritant action on the alimentary canal than the other preparations of iodine, but it may be a question whether it will be possible to induce patients to persevere in a medicine requiring to be given in such large doses, making a meal rather than a medicine!

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18. *Action of Acetate of Lead upon Animal matter.*—Dr. C. G. Mitscherlich has instituted a series of experiments on this subject, the results of which are of the highest value in therapeutics. As soon as acetate of lead in solution comes in contact with animal matter, new compounds are formed, which contain lead and an organic substance. Some of these compounds are soluble in water; others can be rendered soluble by the addition of a small quantity of acetic acid, lactic acid, or chlorohydric acid, while others are quite insoluble in water and in acids. As most of the compounds which sugar of lead forms with the constituents of animal organic matter are very little or not at all soluble in water, poisoning by lead in all those parts of the body which do not abundantly secrete acids, can only take

place slowly or not at all. Wounds and ulcers are in the same predicament in which a general action of the lead is exhibited, as soon as the acetate of lead decomposed by albumen, and dissolved in acetic acid, is brought in contact with them. The parts are acted on by the acetate of lead, but the oxide of lead remains in its new state of combination, wholly, or for the most part, undissolved.

The acetate of lead in the stomach or on a secreting surface, accumulating, is first decomposed by the secretion and the contents of the organ on which it has collected. This we ascertain by means of large and small doses, and can perform the experiment with safety when it is made with combinations of salts of lead and organic matter.

Acetate of lead passes in the stomach when it is decomposed by the constituents of the secretions, and its contents partly into combinations soluble in water, but the greater portion remains as an insoluble combination with the mucus. The dissolved compounds are partly of themselves dissolved by water, and partly are brought into solution by the free acids of the stomach, chlorohydric and lactic [?] acids.

Acetate of lead, when it is not completely decomposed by the constituents of the secretion, presents two series of appearances, viz. the direct corrosion of the organic surface of the mucous membrane, and new soluble compounds of lead with organic matter. If it is on the other hand completely decomposed by the secretion, the last appearance only occurs, which is produced when we combine the acetate of lead with albumen, dissolve it in acetic acid, and poison an animal by this compound.

The corrosion which the acetate of lead produces in the stomach depends upon the affinity of this metallic salt to the constituents of the mucous coat, and the deteriorated portions of the mucous coat are in a similar condition to other organic surfaces which are corroded by acetate of lead, for example, ulcers. The scurf formed is of a white colour, partially dissolves mechanically, partially is decomposed by the contents of the stomach, or passes out along with the fæces. The parts injured are similarly affected to an ulcer when it is corroded by acetate of lead; no inflammation is produced, but either a rapid cure or an ulcer. The direct corrosion of the living surface hastens death. But if the acetate of lead is decomposed before its contact with the organic surface, the peculiar poisoning by lead alone follows. This is also occasioned by the combination of the salts of lead with animal matter dissolved in muriatic and lactic acids. But we can produce it more certainly when we decompose acetate of lead with albumen, dissolve it in acetic acid, and poison by this solution.

Thus far are the appearances of the action of lead cleared up. But to expose the subsequent symptoms, it is necessary to examine the chemical properties of these new compounds among each other; their chemical action, and their relation to the different solid and fluid parts of the organism. Besides a much more intimate knowledge of the composition of many animal structures than we at present possess, is requisite. Such an examination is scarcely practicable with our present methods of investigation. The solution of the new compound in acids acts chemically. This has been ascertained after death, both in the stomach and in wounds.

The chemical examination of the blood and urine shows that the blood, in cases of poisoning, after death contains very little or no lead, and that no lead is discharged with the urine; that a combination takes place in the blood is very probable, because the symptoms in the living body are not of the kind which can be attributed to injury of the nerves. The symptoms proceed slowly, and increase in proportion to the chemical action. All symptoms on the contrary, which proceed from any of the nerves, follow rapidly, almost immediately.

Gaspard's experiment with 2 grains of sugar of lead introduced into the jugular vein is an illustration of this.

The appearances during life agree with those after death, and clear up, in a great measure, the action. An interruption in the functions of the intestinal canal, of the lungs, kidneys, and of nutrition, is more or less evident in experiments. The large intestines are usually empty. In dogs, we can easily excite a sanguineous extravasation in the whole of the intestinal canal. In rabbits, this exudation of blood is observed in different places. It is observable especially in the cavity of the abdomen, in the sac of the pleura, and in the urine. In one case it was observed between the outer membrane and the cortical substance of the kidneys. The organs in which this extravasion appears only undergo a change of structure, in so far as the vessels are filled with blood and the structure appears red. In the intestinal canal it is only the interior vessels which are affected. We sometimes find much blood in the large vessels under the peritoneum which covers the intestinal canal, but no inflammation.

If blood is extravasated in the sac of the pleura, the lung is darker than usual, but not soft and hepatized. In bloody urine the kidney is never softer, but darker than usual, and we find the cortical substance and the interior of the kidneys as far as the papillæ more or less coloured, by which we know that the vessels are filled with blood. We have in this case a similar appearance to that which is exhibited in dogs in the intestinal canal; in rabbits, in different organs, sometimes in one, sometimes in another, but especially in the kidneys; this redness of the organs occurs in different degrees, sometimes accompanied with extravasation of blood. Orfila and others have considered it inflammation. Gaspard calls it a slow, peculiar kind of inflammation. But this redness is not an inflammation, as the structure is not softened, and we do not find the capillary ramiform and point-like injection which characterizes true inflammation. The symptoms during life also are not inflammatory. The only symptom of fever is constant thirst. This redness which occurs in poisoning by many other metals, is probably produced by a decomposition of the blood. An engorgement of the vessels with blood takes place in the secreting organs. The external appearance of the blood also strengthens this idea. It has a peculiar colour, and is strongly coagulated; the blood globules are very dark, and the fluid part is more or less considerable, according to the manner in which the thirst has been appeased during life, but always possesses a peculiar red colour, and often contains mucus (*schleimig gefunden.*) These external appearances point out an alteration in the blood, although chemical and microscopical examinations exhibit no substantial changes. The redness does not prove the existence of inflammation, but only an engorgement of the absorbents, in consequence, probably, of the decomposition of the blood. The cause of the extravasation of blood in the intestinal canal from poisoning by wounds, by the veins, and by the stomach, is not yet ascertained. We must rest contented with the fact. The difficulty of respiration is accounted for by the *post-mortem* appearances. The lungs are found to be very dense after death, with some dark coagulated blood in the capillary vessels, almost without serum and air. This is less distinct when the poison has acted through a wound; in a stronger degree when a solution of sugar of lead in large doses has been introduced into the stomach. The function of the kidneys is essentially changed. The excretion of urine is greatly increased, and in proportion to the thirst. The urine is clear when the poisoning has been gradually produced by small doses, but it becomes milky and even bloody when the poison doses have been large. In the latter case we find the vessels of the kidney more or less filled with blood. In very large doses, which have strongly corroded the intestinal canal, a change in the urine occurs more seldom. From these appearances we may presume that injurious matter is separated from the blood with the urine, more especially as the animal recovers itself after such evacuations, and we may consider the thirst as a requisite for supplying the waste. This deduction however is not proved, as no such chemical matter has been detected in the urine. The liver and spleen only exhibit alterations in colour, which depend on the infiltration of blood. The brain exhibits no change, but the activity of the spinal marrow is often interrupted; and we find frequently paralysis of the posterior extremities. No remarkable changes are perceptible in the spinal marrow after death. The whole of the body of the animal is, after death, emaciated. This is easily accounted for by the great evacuations from the kidneys, &c.

From these results of experiments upon the physiological action of acetate of lead, it is obvious that the facts observed are of importance in a practical point of view.—*British Ann. Med.* 17 *Feb.* 1837, and *Müller's Archiv. fur Anat. Phys., &c.* No. V. 1836.